RESEARCH PROBLEM STATEMENT #DC-508

I – Problem Title
Development of an Aesthetic / Low-Maintenance Guardrail System (LAP-03)

II – Research Problem Statement
Standard metal beam guardrail (MBGR) is very expensive to maintain in locations with frequent vehicle impacts. In addition, local communities and agencies are increasingly demanding that Caltrans build highway projects that include roadside barriers with an aesthetic appearance, which standard W-beam guardrail does not provide. Some highway construction projects are actually delayed because the barriers do not present such an appearance. There are only a limited number of *NCHRP Report 350* test level 3 approved aesthetic barriers, but most are proprietary, expensive to build and expensive to maintain.

III – Objective
The purpose of this research is to have non-proprietary standard plans for an aesthetically pleasing guardrail system that meets the context sensitive demands of locals, and requires less maintenance than MBGR. This will be accomplished by attaining the following objectives:
* Develop a guardrail system that is aesthetically pleasing and context sensitive to meet the needs for locations where such guardrail has been in demand. (Example National Parks and the Tahoe basin).
* Develop a guardrail system functionally that is low-maintenance and has low life-cycle costs for frequently impacted locations.
* Develop all components of the system to include length-of-need barrier, end treatment and bridge transition.
* Crash test the system to meet NCHRP *Report 350* test level 3 requirements.
* Deploy the product as a non-proprietary standard plan that all roads and highway agencies can install.

IV – Background
The commonly used W-beam guardrail systems, which incorporate a steel rail and various types of wood and steel posts, are not aesthetically appropriate for the context in which they are placed and require considerable maintenance after vehicle impacts. Even low-energy impacts can bend and damage the steel rails and displace posts enough that the barrier might not perform properly in a subsequent impact. Maintenance crews must spend considerable time on the roadside keeping W-beam guardrail in safe condition. This amounts to high costs, reduced roadside safety for motorists, and exposure of maintenance workers to highway hazards. Several projects throughout the state, particularly in the Lake Tahoe basin, have been delayed because local agencies demand a barrier that is pleasing to the eye and conforms to the local surroundings. Some aesthetic barriers considered such as colored standard guardrail, timber-backed guardrail and stonewall guardrail are very expensive to build and require high maintenance. Standard guardrail using weathering steel is not permitted to be installed on state highways due to high corrosion at the lap splices in wet climates.

V – Statement of Urgency and Benefits

The result of this project will offer a guardrail system with improved safety performance and low maintenance costs. This will potentially reduce injuries and loss of life, as well as lower life-cycle costs by minimizing the time maintenance personnel spend repairing and replacing damaged guardrail. It will also meet the aesthetic demands of local agencies. The final product of this project should be a set of non-proprietary standard plans that will be made available to any entity that wishes to install the device.

VI – Related Research

(Not provided)

VII – Deployment Potential

(Not provided)